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ABSTRACT

This study on how teachers learn from experience to teach, explores teachers' recognitions of and responses to puzzles and surprises in the classroom when they involve coming to see in new ways the classroom setting and their personal role within it. Interview and observation data from four teachers provided the information for an analysis of this topic. A pattern is seen of development in teachers' awareness of the events of their practice. Initially, awareness is at the level of becoming familiar with strategies with which one is comfortable and capable. Another level involves "fine tuning" one's strategies. At both levels, teachers are seeing their practice within a constant frame, and are unlikely to be attentive to the "back talk" from their classrooms. At another level, teachers are able to listen to students and to their practices, to reflect on puzzling situations, and begin to see their teaching in a new frame. This seeing practice differently is played out in the actions of teaching and is not necessarily thought out. Brief case histories are given of the four teachers studied, each of whom demonstrates teacher thinking at some point in the developmental continuum of learning to teach. (JD)

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TEACHERS LEARNING FROM EXPERIENCES OF TEACHING: ANALYSES BASED ON METAPHOR AND REFLECTION[1]

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Introduction

How do teachers learn to teach? And is it important that we understand the process of learning to teach? Our research is based on the assumptions that the process of learning to teach is poorly understood and that improving our understanding is crucial to further progress in the development of teaching as a profession. Student teachers consistently tell us that practice teaching is the most valuable part of their preservice program; it would be surprising if they replied otherwise. Our culture has many familiar expressions concerning the perception that we do learn from experience: we talk about learning by doing, learning from experience, and learning from our mistakes. But school itself sends a very different message to its clients, including those who will become teachers, and that message suggests that we learn from books and by being told. The point, then, is that neither beginning nor experienced teachers should be assumed to understand the nature of their professional knowledge nor the processes by which they acquire it. We do learn from experience, but some learn more than others and some learn faster and more effectively than others. Furthermore, there is little in the environment of the school or the preservice program to make teachers aware of that learning process and how they might gain more control over the development of their professional knowledge.

Our study of the nature and development of teachers' professional knowledge has been guided by Schön's (1983) concept of *reflection-in-action* and his related critique of "the model of Technical Rationality, which leads us to think of intelligent practice as an *application* of knowledge to instrumental decisions" (p. 50). We are particularly interested in the implications for teacher education of the perspective that "intelligent practice" in the classroom develops *in action* rather than by application to action of rules learned outside the context of practice, in courses, workshops, and texts about how to teach (Russell, 1986, in press). This paper examines four teachers' learning from their actions of teaching.

While there is growing awareness among teacher educators of Schön's (1983, 1987) arguments, it is important to recognize that those arguments are complex and subject to multiple interpretations. We are particularly aware of our own evolving understandings as we have worked with the ideas since they first appeared in 1983. The following passage from Schön's early discussion of reflection-in-action gives an initial indication of the domain that interests us as we

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work with teachers to understand their professional knowledge and how it develops in response to events of practice:

> When the phenomenon at hand eludes the ordinary categories of knowledge-in-practice, presenting itself as unique or unstable, the practitioner may surface and criticize his initial understanding of the phenomenon, construct a new description of it, and test the new description by an on-the-spot experiment. Sometimes he arrives at a new theory of the phenomenon by articulating a feeling he has about it.
>
> When he finds himself stuck in a problematic situation which he cannot readily convert to a manageable problem, he may construct a new way of setting the problem--a new frame which, in what I shall call a "frame experiment," he tries to impose on the situation.
>
> When he is confronted with demands that seem incompatible or inconsistent, he may respond by reflecting on the appreciations which he and others have brought to the situation. Conscious of a dilemma, he may attribute it to the way in which he has set his problem, or even to the way in which he has framed his role. He may then find a way of integrating, or choosing among, the values at stake in the situation. (Schön, 1983, pp. 62-63)

Thus we are interested in teachers' recognition of and responses to puzzles and surprises, particularly when these involve coming to see in new ways the classroom setting and their personal role within it. It is this process of learning from the activities of practice that is the focus of our study of the development of teachers' professional knowledge.

Our data collection involves interviews with teachers immediately following a period of classroom observation; interviews are spaced at monthly intervals, when possible. The 15 participants include teachers in a preservice teacher education program, teachers in their first and second years of teaching, and several teachers with a number of years of experience. In addition to our study of reflection-in-action, we are also interested in the concept of "seeing as" applied to teachers' views of their work: the process of perception is regarded not as observation followed by selection and interpretation but as a unified process in which observation *is* interpretive. Individuals vary in their ways of interpreting classroom events and in their awareness of possible alternative interpretations. Thus we are also interested in the occurrence and significance of metaphors in teachers' accounts of their practical knowledge (Munby, 1986).

We have worked extensively to elaborate the meaning of Schön's concept of "reflection-in-action" in the context of observing and interviewing teachers about their work. In the process, we have come to understand that the central feature of this concept is "in-action," not the familiar sense of "reflection" that most of us take the word to mean. As we now understand Schön's argument, "reflection-in-action" emerges within a teacher's activities of teaching, in close relationship with a reframing of the teaching situation that one may not be clearly aware of or easily able to express in words. New actions go hand in hand with new frames for the context of practice. Some actions will survive and others will not, as their consequences become more clearly understood. On this reading of Schön's work, "reflection-in-action" may be very difficult to detect. While we find observation of teaching essential to the process of interviewing teachers about their professional activities, we would not expect to observe directly the experience of "reflection-in-action." Our present strategy involves a combination of teachers' own reports of changes in their teaching approaches and views of the classroom context with analysis of teachers' interviews over time in search of shifts in the imagery they use to describe their work. It is in this manner that we link the perspectives of reflection and metaphor in our data analysis.

Four Teachers Learning from their Teaching

In this section we present data from four teachers participating in our study. Wendy and Nancy are in their second year of teaching, Roger is in his fifth year, and Diane is in her eleventh year. The sequence for the data is a developmental one, beginning with Wendy and moving on to Nancy and Diane, concluding with Roger who shows the highest level of learning from his experiences of teaching. We are particularly interested in the extent to which each of the four shows evidence of reframing of the events of practice, apparent both in actions and in awareness of changed perspectives.

Wendy, a high school science teacher, provides an illustration of a teacher whose perspective on teaching remains relatively stable. Her learning from her classroom experiences involves refinement of presentation strategies but does not display changes in her view of how students learn. Nancy, a Grade 2 teacher, shows how experimentation and modification of her actions in the classroom leads to a reframing of her perspective on teaching. Learning from her experiences in the classroom involves developing deeper understanding of her child-centered philosophy of teaching. Diane, who presently teaches Grade 1, discusses the complexity of relating the elements of classroom actions, theory, and a philosophy of teaching to her development of professional knowledge. She explains how her awareness of her perspective on teaching guides her learning from her actions in the classroom. Roger, who has been teaching Grades 7 and 8 science for four years, illustrates how cycles of reframing experience generate significant growth in professional knowledge. Experience leads Roger to puzzle over his view of how students learn, and this leads to experimentation with how students best learn science concepts.

Wendy

Wendy is in her second year as a high school science teacher. As we have watched her teach and listened to her discussions of her initial experiences of teaching, we have concluded that her learning from the experience of teaching seems constrained by her image of teaching. Viewing teaching as the transmission of knowledge seems to prevent Wendy from relying on her own experiences and treating them as a valid source of professional knowledge. It has been her experience to obtain knowledge from external sources and so she does not seem to expect her own teaching experiences to inform or teach her. As a result, Wendy appears to be refining her teaching strategies, but not developing new perspectives on practice from her involvement with students and materials.

Separating ideals of practice from classroom actions seems to contribute to the stability we see in Wendy's work and in her discussions of that work. There appears to be little evidence that Wendy experiments through her actions in the classroom, modifying them so that they approach more closely her ideals. Actions and ideals remain separate and distinct. Wendy regards knowledge as information that comes in packaged ideas. The ways in which she is accustomed to learning seem to be reenacted in her actions with students. Transmission of information is directly from teacher to student, with evaluation in the form of tests as the only method used to see if the information has been received. (The short code included with each quotation identifies the participant and interview within our data files.)

> 86F6 I know that I feel that I don't seem to be teaching if I'm not up there telling them what to do, or teaching them. And somebody said, "Be easy on yourself; let the kids do the work." I never thought about that before! I thought that was my job -- to give them everything, to feed them information! But that's not really learning! If they learned it on their own, that seems to be learning.

For Wendy, teaching is "covering the curriculum" and "getting it across." In recent comments about her second-year experience, we see that Wendy is making changes. She talks about different techniques that enable her to "get it across" more effectively. She sees herself making more connections between topics, interrelating material for students, and encouraging them to make their own connections. To this point, learning from the experience of teaching seems to involve "fine tuning" rather than reframing of experience through significant new teaching actions.

> 2FF1 I know everything that I wasn't sure of last year with the subject matter. I'm more confident of that. That makes everything so much more easier. I'm cutting out things that I know didn't work right away, and I'm trying a few new techniques, especially in how I approach the subject in terms of, "Do you do the lab first or do you do the lesson first?" I'm trying to get them to do more work than me, so I get them to do more learning themselves.

> 3FF3 I tried a few labs differently. I demonstrated a few labs that we did last year which were confusing for the kids. I spent more time explaining. Last year I didn't really get the concept over of what they were supposed to be getting out of these labs. And this year . . . I asked questions so I was asking them to interpret what was going on while we were doing it. So I asked more questions, and I think their understanding was better because of that.

Ideals separated from practice. Wendy seems to be holding her ideals of teaching separate from her practice. She speaks of wanting to make science fun for her students and relevant to their lives, but she recognizes that achieving that goal would mean a lot of work on her part -- work that she has not been told how to do. She says that she feels that students should learn to work independently, that school should be "learning how to learn," and that the learning process is more important than product. But she lacks examples of how this might be done, and so she teaches as she was taught. Wendy frequently relates her teaching to that done by other science teachers, in terms of rate of progress through the curriculum, and it may be assumed that she is willing and eager to bring her practices in line with colleagues in her department.

> 44F6 Right now as first year teachers, we're teaching the subject matter; we're not teaching them how to learn. The thought of me teaching them how to learn seems so strange! In the backs of our minds, that's what we're working for, but somebody tell me how to do it! I'm not sure how to do it, so I'm going to leave it out "here" for now until I'm capable of understanding what I have to do in order to do it.

> 17FF3 Instead of learning science or learning English or French, learning how to interpret . . . how to form an opinion . . . believing in something and sticking by it -- making sure you can support what you believe in. As long as they learn those values they can apply them to any subject . . . it's an ideal thing that I would like, and it's the sort of thing that you think about and it seems really nice, and then you go on, and life is so hectic as it is, that it gets left out.

In spite of a discussion of ideals, we see little evidence that Wendy is learning to teach so that her teaching involves "learning how to learn." Rather, we see a teacher whose view of teaching remains relatively unchanged during her first year and a half of teaching. We do not see a reframing of her perspectives on teaching, but we do see how her experience contributes to a modification in strategies that enable her to teach more effectively within her existing frame of teaching. Her view that teaching is "covering the curriculum" does not change. Her experience in the classroom leads to refinement of her presentation strategies so that she is more confident that students are covering the curriculum.

Change requires time and thought. Wendy espouses a view of practice that she says she would like to incorporate into her teaching, but she seems to find it very difficult to connect her actions and experiences in the classroom with the process of achieving that goal of modifying her teaching. When Wendy expresses her desire to change various aspects of her practice, she also acknowledges that thinking is difficult and requires time that she has not yet found.

> 60F6 When I have the opportunity to sit down and talk about things, then things click and I can see the lightbulbs bursting in my head! Most of the time I don't think about what I've been doing. I've been thinking on a very superficial level and there's not many times I get to think.

> 93F6 The idea that I have is that if I thought more about how I wanted to approach my style of teaching, and how I could change it -- if I thought about how kids learned, then I could change my style of teaching so they could learn better.

> 3FF3 Something I haven't done which I'd like to change: I still find I make myself the center of attention. I'm up at the blackboard -- I'm the one teaching them instead of having them teach themselves. I would like for them to do more self-learning instead of guided learning. Even I don't do guided learning -- I'm more of a lecturer instead of guided learning or self-learning. I think I would like them to do more of that, but for me to do that takes a lot of work -- I've got a lot of thinking to do and I haven't got around to that yet! I have a lot of ideas but I haven't sat down to do something about them. And I'm sure that will come with time -- even after a year it gets better.

> 17FF3 When you "want" to change things, you have to be -- physically and actively thinking about it all the time. And I don't think about it enough to actually be thinking about changing it, and thinking about ways to change it. It's not something that I've done a lot with.

It would be easy to be critical of Wendy, for the process of change seems much easier to outsiders than to those who actually do it, or think about doing it. We value and respect Wendy's personal integrity, and are intrigued by the process in which she develops and refines her practices while maintaining values not reflected in those practices. Wendy's openness has enabled us to see the very real tensions faced by the beginning teacher, who has long been known to become more "conservative" in the first year of teaching. As Wendy gains confidence and experience, it appears that the environment in which she finds herself does not encourage and support the "reflection-in-action" that would enable her to explore her ideals at the level of practice.

Nancy

Nancy is a beginning teacher who, in contrast to Wendy, does seem able to explore and modify her beliefs about teaching through her classroom experiences. As Nancy attends to puzzling situations and develops alternate strategies, she moves from learning what she is able to do in the classroom to learning how to deliberately change her actions. At the one and the same time, her educational ideals drive her to explore new possibilities and her experiences in the classroom generate a rethinking of her beliefs about teaching. Nancy appears to hold firmly a definition of learning that she acquired through her teacher education experiences. As she teaches, she tests and refines it, and makes considerable progress in understanding its full meaning. As her practical knowledge develops, it is exciting to watch how her original beliefs about teaching and learning go through significant modifications and personalization.

Linking practice with ideals. In her first weeks of teaching, Nancy becomes aware of unfamiliar management details and logistical concerns, which she calls the "nitty-gritty." She finds few "exemplars" to guide her practice. Much of her preservice education (including her practice teaching experiences) now seems unrelated and unhelpful. Initially, she assumes that she could have learned the "nitty-gritty" by being told, and she resents not having been told. As she gains experience, Nancy uses her own actions in the classroom as exemplars for reflecting on the puzzles and surprises of practice. She begins to experiment with and modify her repertoire of strategies in response to her teaching experiences.

> 8C2 When I'm teaching them to do a picture, you know, I step back and I'm always looking at myself and wondering, "Do I accept everything a child gives me?" Obviously, no. But where do I draw the line? And that's where I think your instinct comes in.

> 12C2 I can look now at what the kids are doing and say, "No, I'm going to have to modify that." And I know how I'm going to modify it.

> 1C4 I'm wondering what if someone comes in and says, "Why are you using puzzles as an extra activity?" Could I validate it? I think I could, but I'm not sure, so I have to go home and think about why I do things the way I do.

As Nancy becomes more confident in her actions, it is significant to note that she now expresses more strongly the need to know "why" she is acting in certain ways. The "how" of her actions is beginning to be answered, for the most part through her own experimentation. The "why" is less easily accessed through self-examination or discussion with colleagues.

> 19C7 I question myself all the time, "Why am I doing this?" "Is this important?"

> 30C9 I was talking to another teacher at school and I said, "There has to be a balance between a totally individualized program and the kind of program we offer here." And she said, "Oh, I don't care. I've got enough things to worry about." She wasn't being rude, she was just saying, "Oh, I don't have time to think about that." And I thought, "Here we sit and talk at great lengths, discussing and reflecting on why something is the way it is, and this teacher just seemed so calm, as if she knows why she does things! Everything is just so -- there." She does think, but we're never like two teachers professionally discussing things. Nobody there ever discusses with me *why* they do things, what's behind what they do. Paul is a first-year teacher and I said to him, "You seem so calm and cool. Do you never wonder why, or if what you're doing is right?" And he said, "Yeah, I do. But I figure it's not worth getting all worked up about, so I don't." [Another teacher] does discuss things with me, to the extent that she might say, "This is what I learned in teachers' college. This is how I do it, and this is the way I think it should be done." But nobody ever says, "I wonder why I do it this way?"

As Nancy's reflections on and modifications of classroom actions contribute to the development of effective strategies, she encounters the dilemma of linking her strategies with her beliefs about teaching. She believes in the value of child-centered teaching and feels that activity centers are a method of achieving that child-centeredness, but she is still more comfortable with a teacher-directed approach and so moves away from the use of activity centers.

> 12C4 Over the last few weeks, I haven't been doing centers. And that's because I obviously have them more at my fingertips when they're not in centers. And you hear

all about it being a child-centered, rather than a teacher-centered, education. And I'm totally for that, and I hope that's the way I run my classroom. However, at first I do want -- not to have control of them, but I want to be able to feel like I know where they're at. Right now, I'm learning what a Grade 2 -- how they think.

Modifying perspectives on practice. As Nancy moves into the second half of her first year, she demonstrates through her actions that her beliefs about the importance of child-centeredness in teaching are changing. She discusses modifying a strategy that is child-centered in nature but does not answer the needs of particular students. As she works through the dilemma of how to create and maintain a child-centered environment, she begins to question her belief in child-centeredness. She realizes that her students need skills, routines, and structure to function effectively in activity centers. Through the process of experimenting with different approaches, Nancy modifies her own beliefs in child-centered learning as she also learns how to implement those beliefs through her actions in the classroom.

4C5 I'm for centers, I really am, but with these kids I've found that it's better to devote the whole morning to Language Arts. Then I don't feel like I'm pressuring. As far as doing group activity and then doing centers, it's hard on me, because I don't feel comfortable with doing that. I don't feel the kids are getting the skills they need. I'm for centers, I really am, and I don't like to see people knock them. But I agree too, that you need to do the skills, and get the skills done, and then have centers.

23C5 I'm finding with some of these kids that there are some I'd love to give centers to. And they could work independently. But the majority of them can't. And if they don't have the basic skills, I'm not going to give them things to do independently that they are struggling with, things that I can't teach a group lesson about.

31C5 They are using their imaginations, they're critically thinking. They're not just taking my word for it, they're seeing it on their own. . . . And that's what these kids need to learn -- independence. When they're operating on their own, I feel good. I think the ideal thing for me to do is to know next year when I set my routines, that my routines are so set, not boring and rigid, but so set that this class could run smoothly without me here.

20C10 You can do centers with a certain group of kids. I could tell you the kids I could give centers to and they could work independently.

Learning from one's own actions in the classroom seems to involve a teacher listening to students and self, critically blending methods and curricula with ideals and beliefs about practice. This unique blend can be regarded as a teacher's personal view of practice, an evolving melding of events and ideas. As Nancy focuses more intently on her students, listening to them and responding to them, she demonstrates through her actions that she is reframing her views of practice; the strategies are being refined and the developing beliefs about learning are being acted out.

Changed perspectives on practice. Nancy moves through several stages of professional development in her first year of teaching. She feels the fear of not-knowing and the satisfaction of experimenting with and shaping her practice. Through her actions and her reflections on those actions, we see how being able to listen to herself leads to a new perspective. A philosophy of how to be a teacher does not come prepackaged and neatly wrapped, ready for use. A beginning teacher may enter teaching with an ideal of practice, but through action and reflection may discover a more personally satisfying ideal. For Nancy, the challenge of trying to create a child-centered learning environment seems to encourage her to experiment with various strategies. Through her

experimentation, she has developed a new perspective on child-centered learning that includes her discoveries about how children learn. She now realizes that her earlier view had equated child-centeredness with "total freedom for the child." While she still believes in a child-centered approach, she has reinterpreted that ideal to imply a balance between child-centeredness and teacher-direction.

> 4CC2 Well, centers are a good approach, but I think that with some classes you can do it with, some classes you can't. Last year my class you couldn't do it with; you could do it with maybe five of them. So then you have to be more teacher-directed, more structured. This year, they can. They've already done projects on their own. . . . It's still a balance; it really is a balance. When you think of centers, the kids still need to learn how to write. I mean, whether they're writing on a ditto that you've structured or they're writing on a piece of paper, they still have to write.

> 6CC2 I think there are certain things the teacher is there for. Sure kids experience and learn by doing and by figuring things out on their own, but to a certain degree they have to be teacher directed. You have to still tell them what so and so does and how to use such and such an instrument.

As she moves into her second year, Nancy is able to explain the kind of classroom teaching environment she wants and how she has learned to think about activity centers. New understandings and reinterpretations of the meaning of "teacher direction" within a child-centered approach appear to be the *fundamental change* that has occurred in Nancy's professional knowledge, and this change was "probably not originally represented in words at all" (Schön, 1983, p. 59). Through Nancy's actions, we see changes in her practical knowledge; through her words, we hear about the role of experience in altering her perspectives on teaching.

> 21CC3 Particularly with the centers in the afternoon, I can step back and it's because of the kids. It is. It's because it runs so smoothly. They're always on task. I feel better about myself and I feel that I don't have to keep stepping back and saying, "Is this working?" because I know it is.

> 21CC1 What I want is not total freedom, but sometimes I feel I'm still too teacher-directed. I feel comfortable with that at the moment, until I learn and I'm organized enough to have centers that run smoothly. Then I will feel that I can take my hands off. But I don't feel the kids are getting any less of an education because I think I do try and let them make decisions. Centers take more work and more organization than teacher-directed learning and I agree with that. But I'm not there, not by any means. I won't be there for many years.

> 16CC3 I think you learn what you think through your experiences. Like my philosophy of teaching. Before I started teaching, it was, "Well, kids learn by doing." How did I gain that philosophy? Was it because I really believed that, or because that's what everybody told me that's what I was supposed to say?

> 17CC3 I think I believed that philosophy when I said it. I do believe kids learn by doing, and I believe that centers are an important way of teaching primary kids, but I would definitely refute the idea of centers for the whole day.

Nancy has arrived at a significant stage in her early professional development. She is beginning to build her own perspective on children's learning through her actions in the classroom. She has pushed herself to explore her ideals at the level of practice and, in doing so, she has modified

both her ideals and her methods in the quest for a better balance between student-centered and teacher-directed learning.

Diane

With more than 10 years of teaching experience, Diane provides an interesting contrast both to Wendy, who has yet to consider her ideals of teaching at the level of practice, and to Nancy, who is in the midst of sorting out her methods and her perspective on teaching. Diane has developed a perspective on teaching with which she is comfortable and confident. She believes that learning is a natural activity for children and that her job is to create conditions that foster their learning. In the following account, she recalls how the interrelationship of theory and practice contributed to the development of her perspective on teaching; she discusses how her awareness of that perspective now influences the process by which her knowledge of theory and her attention to practice continue to enhance her professional knowledge.

Practice, theory, and a philosophy of teaching. Diane has taught at several elementary grade levels from Kindergarten to Grade 8. The data here are taken from interviews during her eleventh year of teaching, her second year at the Grade 1 level. Her ability to articulate her thoughts about her growth as a teacher provides a fascinating account of how one teacher has learned to relate both her theoretical knowledge and her classroom experiences with her philosophy of teaching. The puzzles and surprises of her practice challenge her to look to the theory of how students learn. Reflection on her actions drives her quest for theory about learning and, at the same time, knowledge about the theory of learning functions to refine her actions. She has blended both theory and experience into her perspective on teaching. A central puzzle in Diane's reflection on her classroom actions concerns how students learn. She feels she needs to know the theory of learning to read so she can attune her strategies with her philosophy of "easy learning."

> 8D3 I needed to know, really know, especially in the primary, how they learned how to read so that I could give it to them easy. I didn't like teaching them the phonics and all that. It was too hard for them. They didn't like it. I had to threaten them or they wouldn't learn it and when they did know it, they didn't know what to do with it. So I had to know a lot more about the subject.

> 12D3 The study of reading has really, I think, helped me a lot to feel, "This is the right way to do it." . . . I just felt better about the things I was doing because they suited what I had studied about reading and they went along with my philosophy of learning, what I call "easy learning." Let the child lead you. And if he's not happy, then you're doing something wrong. You're getting in his way or you're going too fast or something like that. When things matched my philosophy, the type of instruction I like, I kept on with it and even now I eliminate things that I am not comfortable with.

In describing her philosophy of teaching as "finding the child's path and letting him lead you," she alludes to the complexity of the relationship between practice, theory, and a philosophy of teaching. She questions whether her methods have changed her philosophy or whether her philosophy has demanded that she search for specific methods to match.

> 17D3 I wonder about that, if it's [philosophy of teaching] really changed or if it's been there all along, only I didn't have the methods to match it. I think I always felt the same about how children should be treated.

> 29D3 Every once in a while you think when you're teaching . . . it is so complex when you start to look at it. If you didn't know any theory, you might be better off. It can

get in the way. You see, you start to question, you criticize. If you didn't have any theory about math, for example, and you weren't the type of person to question anything at all, you would just hand them the book and they would have to do it.

Refining practice. While Diane has worked to combine elements of theory and teaching strategies into a personal statement of beliefs about practice, experimentation continues to play an important role in her approach to her practice. As she searches for alternate theories and strategies and continues to refine and modify, the fundamental philosophy that supports her actions in the classroom remains relatively unchanged and serves to guide her experimentation. The learning that occurs when she experiments with the "how" and questions the "why" of teaching contributes to her professional knowledge, but does not seem to alter her belief about her role in children's learning.

25D5 I use an investigative approach. I've read the books and I've got a couple of their themes, the little suggestions they have for units. And then I talk to people who use it and look at their work. You can take from that, "Well I'll try that." You don't seem so tied down to it because you don't know that approach as well as somebody who's taken the course and so you don't use it all the time. You look for a variety of approaches.

40D6 I think what I'm getting is feedback from the kids too. Things like, "Hey, this is working." "I'm learning to write. I couldn't write before." "I'm learning to read." You're going to see this in primary grades. And I think I've maybe spent more time thinking about what I'm doing. I'm more confident.

35D2 If you can just find what suits the kids the best, at what point in the day, boy, you've found out something that's really important.

Constructing professional knowledge. Diane recalls her need to acquire a solid knowledge base in her first years of teaching by taking additional qualification courses, talking to other teachers on professional activity days, and visiting other classrooms, especially when she moved from one grade level to another. Once she had become comfortable with the routines of teaching, she enrolled in graduate level courses to learn the theory of "how" children think. Now, further along in her career, Diane feels that there is another level of professional knowledge that she has yet to attain, that of inventing her own ideas rather than modifying those of others.

35D6 The first few years of teaching, I think, you're trying to get through the day. And I think you have a philosophy in the back of your mind. You have no idea how to put it together with the real life in the classroom. And I *think* that you have to start with getting through from 9-to-4. So, maybe -- I don't like to think that -- somebody's got to hand you a package? I don't like to say that. I don't suppose the people at [the Faculty of Education] want to say that either. They say, "You go out and invent it." Do you know how long it takes me to invent 9-to-4 five days a week! I think I'm just starting to. I don't know if I'm even inventing now. I think there's another level for me yet.
And what do you think that is?
When I will come up with that idea that the superintendent has. People come along and they say something and usually I've been thinking that for years! I've always believed that. I just never knew *how* to get from my idea to what was happening. I think that's why I'm enjoying this year so much. My philosophy is right there, in action, and I've never *ever* -- and I've been teaching, it seems, a long time and I've taken a lot of courses -- I've taken a lot of package courses, you know. I think you've

got to give them a good package and whose responsibility is this? The Ministry's? The Faculty's? School boards? Good packages; then, counselling: "Let's think about what we're doing here." Suggestions to go from there so they don't sit on that package.

Diane feels that she has a broad knowledge base of the methods of practice and the theory of learning. She is comfortable enough to become critical of the "experts" in order to question theories from the viewpoint of her practical experience in the classroom. The level of professional knowledge that Diane now aspires to is the creation of her own knowledge about teaching. While Diane feels that she has not yet taken control of the construction of her professional knowledge, we see in the following section, a teacher who is actively engaged in that process.

Roger

Data provided by Roger offer insights into the process of "reflection-in-action" that Schön argues is prompted by events of practice and generates new sequences of actions that involve seeing those events in new ways. Now in his fifth year of teaching, Roger teaches science in Grade 7 and Grade 8 in a special program for gifted students. His own accounts of his development of professional knowledge articulate how listening to the "backtalk" of events in his classroom changes his view of learning and his approach to teaching.

Through many years of schooling, Roger experienced the frustration of not understanding what he was "learning," yet doing well enough in school to gain entrance to university. After two years at university, he took a year off, and when he resumed his studies he found he received much higher grades. In particular, he recalls an inquiry-based research course that finally provided opportunities to understand the concepts he was studying. Roger also indicates that several years of experience as a Scout leader provided him with what he now regards as "a large knowledge base of how kids learn" prior to entering preservice teacher education. His preservice program, which included a special emphasis on outdoor and experiential education, helped to confirm the personal value he associates with experiential learning. Once he began to teach in a classroom of his own, his students' responses showed him that inquiry-based learning has to be associated with content. If it is not, he explains, students learn that science is fun but they learn little about the concepts of science. At the same time that Roger's teaching experiences were generating puzzles about how students learn, he was exploring these questions in the work of Driver (1983) and Barnes (1976). Written corroboration of the importance of his puzzles led Roger to experiment with a new approach in which he combines content with an inquiry model of learning. The following data are taken from Roger's own accounts of the experience of working out these puzzles of professional knowledge.

> 2M3 When I came here [to the Faculty of Education], I was very much experiential, very discovery-, inquiry-, process-oriented. And that was great because that was very much the kind of approach and philosophies that were being used here, particularly in science. And when I went to try it, it worked very well. The kids love it and they really enjoy it, but what I noticed was that they were having a lot of fun and they loved science, but they weren't learning anything! And so I began to develop strategies that would deal with that as a side issue. "Yes we'll have some fun, but now we've had some fun, we sort of have to learn some things!" I thought, "This is really stupid. You can't have sort of two parallel approaches to teaching." Anyway, the more I started to read about teaching, and think about it, I really began to look at trying to sort out that dilemma of how is it that people learn so much by *doing* things and yet, when you give kids things to do in science, they don't really learn anything about science other than "science is fun," and "science is enjoyable," and that kind of thing, which is very worthwhile, too.

And I guess the thing that really struck me was I read Ros Driver's book, *The Pupil as Scientist?*. At first, I was really annoyed with the book because basically what it says is that inquiry is screwed up -- I mean, kids can't do anything if they don't know anything, and they can't discover anything or plan their own experiments or whatever if they have no background. It was so obvious that it annoyed me; basically, she's saying that inquiry doesn't work. But I didn't want to know it. You know, it was almost as if I believed in it so strongly that there must be a way to make it work. Anyway, the outcome of that book, really, was to lead into the whole "cognitive science" approach to teaching, and looking at how people learn. And I basically got involved in that sort of thing. . . . And that has led to all kinds of reading on top of that. And discovering, actually, now, there are a lot of people who feel that way. Not that the sort of philosophy or the spirit of inquiry is wrong, but just that there has to be some associated content to go with it, and that this can happen in specific ways so that people have some things, some tools to work with when they go to do this experiential kind of thing. So that's what I played with last year, with my kids, and it was dynamite.

Attention to the events of practice. In the following excerpts we see how Roger's perspective on teaching influences the events he attends to in his classroom. He is very concerned that students are able to make sense of science. This concern, combined with his view of teaching as content *plus* inquiry and his view of science as searching for answers, influences the events of practice that interest him most. He tries to see how students are seeing science.

5M3 Now, the other thing that I've spent quite a bit of time doing is trying to identify how kids see those ideas as well. I present what *I'm* thinking of, get them to present what *they're* thinking of, and then we have a place to start negotiating what this is really about. I'll have the kids work on activities and ask them to use some of their ideas to explain things and then, when *their* explanations don't work so well, I have them go back and say, "Well, maybe there's something not so good about that explanation," and offer them alternative explanations. I have them look at it and, once those alternative explanations are accepted as being reasonably plausible, I then provide more activities and give them opportunity to use that explanation to explain other things.

34M3 I spend a lot of time, often, as things are happening, saying, "Gee, I wonder what the difference is between what I did this time, or what happened last time and this time that caused the difference?"

16M2 I end up learning so much, working this way, about how the *kids* learn, and it helps me enormously. I end up going back and changing all my things immediately, and saying, "Well, I'll have to change that around!" because something that I thought was fairly obvious clearly wasn't!

17MM3 But there were some very nice things that came out of those discussions and you can't ignore that. I love the way they think out loud, which is great, and I guess because of all the dialogue I encourage in the class they do that, and so in this little discussion group they will think out loud. And that's a very profound kind of insight because, you know, we had to deal with that right then and say, "Well, in fact, there *are* two things." And then we got into quite the discussion about it, and it was great. But that was never on the lesson plan. . . for this group, actually, it was important right then.

Stepping back to see what's happening to students. For both Diane and Roger, the ability to step back from the immediacy of classroom activities and see what is happening with their students seems to play an important part in learning from experiences in the classroom. Roger talks about having the time to step back and see what's happening and being continually fascinated by student responses.

> 15MM1 Because things are fairly well laid out now, I can stand back from things a bit and concentrate on the kids who aren't getting into it as much and to look at some aspects of why they don't. And how you can move them from this very structured position to one where they're quite willing to suspend things. One girl, when she started out in Grade 7, was quite lost without any kind of structure and now she really enjoys being confused. And it provides a challenge for her. But that took a long time, about three-quarters of a year. But it took a lot of work to get her to that stage, and a lot of that comes in the feedback that I give in the reports and things that they write. Once the kids are allowed to *believe* that they have some ability to solve these kinds of problems, then everything opens up.

> 2MM1 It's much easier now to step back and look at what's happening as opposed to "Where do we go next?" And I'm also able to predict fairly well the kinds of things that will come up and to get a sense of the kinds of things that kids will understand, the kinds of interesting conceptions that they'll have of things.

In Roger we see a teacher who is able to construct his own interpretation of teaching from his classroom experiences and from theoretical positions about how children learn. His experiences prior to entering the profession helped him to develop his educational ideals and gave him an opportunity to explore and sort out the "how" of teaching. Once in his own classroom, he quickly began to listen to the "backtalk" of events and, at the same time, to explore his ideals through experimentation with his practice. Through his experiences of teaching he continues to construct his professional knowledge.

In this section of the paper we have shown how reflection-in-action may or may not emerge within a teacher's activities of teaching. We deliberately selected teachers from our group of participants to illustrate the range of learning that is apparent when looking for *teachers' reframing of classroom experiences*. The range extends from Wendy, whose professional learning centers on refinement of strategies, to Roger, whose learning involves both reframing of classroom events and major changes of teaching strategy. In the following section, we revisit each of the four teachers to illustrate the link between analysis from the perspective of reflection-in-action and analysis from the perspective of metaphor.

Imagery in Teachers' Discussions of their Teaching

In metaphorical analysis of our participants' interviews, we are examining language patterns within teachers' talk about practice. Shifts in the imagery that teachers use when interpreting classroom events suggest changes in their perspectives on teaching. Examination of language patterns over time lends support to our analysis of learning from the experiences of teaching based on the concept of reflection-in-action.

Wendy

Repetition of words and phrases such as "too academic," "stuff too much into one lecture," "get it across," "stick in a few more concepts," and "get the content to the kids," leads us to believe that Wendy's central perspective relates to "covering the curriculum." She seems to view teaching through a "conduit" metaphor in which knowledge previously taken in by the teacher is passed on to the students. Within this perspective, Wendy's attention during her first year appears to be on herself and her presentation. Her repeated use of "structure," "organized," "frustrating," "doing all the work," "can't seem to change it," and "change means work" gives the impression that Wendy feels she could cover the curriculum better if only she were more organized and more structured in her presentation. In her second year, Wendy continues to talk about structure and organization, but in ways that suggest she now feels more comfortable with her organization of knowledge: "getting all the key points in," "cutting out things that I know didn't work," "trying to interrelate," "better in connecting ideas," and "giving them a lot of work."

In Wendy's second year, her language contains other images that suggest a conduit metaphor. She wants to try different presentation techniques, but feels that she is not that knowledgeable about alternative strategies. She wants someone to "give it to me, so I can give it to them." Notice the view of knowledge suggested by these words: "haven't come across any really neat ideas," "getting bored," "looking for something new," "always have to provide them with new ideas," "should have more detailed knowledge," "running out of ideas," and "if they are willing to give, you take." These phrases suggest that Wendy feels she is lacking in professional knowledge and can only gain such knowledge by having others give it to her. There is little suggestion in her imagery that she is developing her own knowledge from attention to classroom events, an interpretation already noted in our analysis of reflection-in-action.

Nancy

In examining Nancy's language as she talks about her work, we see an interesting shift in the kinds of questions she asks herself. We note that she moves from expressing anxiety and dissatisfaction with what she perceives to be an inadequacy of her knowledge, to asking questions that directly focus on her students and her actions with them in the classroom. Examples of speech that illustrate Nancy's questioning of herself include, "stepping back," "wondering," and "questioning myself." As Nancy moves into the final months of her first year, it is interesting to note that her images of teaching have become almost completely dominated by her perceptions of students. She is acting out her observations of her students through her extensive descriptions of individual students and their accomplishments, needs, and behaviors. Phrases such as "with these kids," "they need," "pinpointing their problems," "finding out where the kids are doing things," and "I'd like to understand her" are strong indications that Nancy is evaluating her work through her increased understanding of her students.

The process of questioning herself and her actions in practice appears to be a critical feature of Nancy's learning from experience. The questioning moves from self-evaluative, anxious reflections as she begins to teach to a deeper quest for understanding of her students and her practice later in the year. Nancy continues to evaluate her own actions, but her questions are framed against her accumulating experience with students. Her questions are no longer phrased in open-ended, rhetorical style. Experience has taught Nancy that her questions about practice can be answered as she learns to hone her observational and analytical skills. Learning to analyze the "live" data of the classroom is a significant step forward in the process of learning to understand one's professional knowledge, and Nancy's discussions give clear evidence of her movements along that path.

Diane

Diane's central metaphor for children's learning involves her idea of "easy learning, finding the child's path and letting him lead you." When talking about the students, her focus is on identifying their needs: "need their own free choice time," "work at their own level," "need to be free to try," "need the quiet time," "need more motivation for harder tasks," "different things needed at different times," and "suits a lot of kids." When Diane speaks about her actions in the classroom, the imagery relates to her awareness of students' abilities and needs and to what she can do to find their learning paths: "watching," "observing," "watching her for good behavior," "if I had watched them more carefully could I have helped?," "trying to show them," "working with him," "helping her find it," and "doing it with him." The emphasis in her language is on her actions, actions directed at providing an environment for learning to take place.

When Diane talks about her professional learning, she also talks about needs; in this case, the needs are her own: "wasn't getting what I needed," "I needed to know," and "learn things when I need to be able to do them." In contrast to Wendy, who would like her professional knowledge given to her, Diane actively searches for knowledge; she recognizes her needs and deliberately sets out to meet them: "grow strong in everything," "talk to other teachers," "try to figure it out," "experiment," "modify," and "criticize." The emphasis in these phrases is again on her actions, actions intended to enhance her professional growth. The view of professional knowledge indicated by these language patterns parallels the view that we have depicted in Diane's account of learning from experience: professional knowledge is gained through experimenting with and modifying classroom activities.

Roger

Roger's dominant metaphor of practice involves creating conditions that foster students' development of knowledge. One of his key phrases is "making sense." He searches for explanations that make sense, he ties ideas together, and he makes connections that are real for his students. These language patterns reflect his constructivist perspective on teaching. Roger talks about "playing," "exploring," "investigating," "fiddling around," "experimenting," and "beginning to wonder," both in relationship to his own learning and in relationship to his students activities in the classroom. For Roger, both science and teaching science are "fascinating, exciting, and fun." He "relates," "coalesces," "integrates," and "pulls together ideas" in his teaching.

When Roger discusses his actions in the classroom we see many similarities to Diane. He is stepping back and looking at what is happening with the students. His focus is on: "how kids see," "how kids learn," "what they're thinking," "the direction they want to go," "interpreting what's going on," and "predicting what kids will do." Like Diane, Roger's role as teacher is that of providing the environment for learning to take place: "providing challenges," and "providing activities that are inherently interesting." In contrast to that of Diane, Roger's imagery of practice suggests greater reliance on his own construction of professional knowledge.

Learning from Experiences of Teaching

In our study of teacher's professional knowledge, we have seen a pattern of development in teachers' awareness of the events of their practices. Initially, awareness is at the level of becoming familiar with strategies with which one is comfortable and capable. Another level involves "fine tuning" one's strategies. In both levels, teachers are seeing their practice within a constant frame and are unlikely to be attentive to the "back talk" from their classrooms. At another level of awareness, teachers are able to listen to students and to their practices, to reflect on puzzling situations, and to begin to see their teaching in a new frame. This seeing practice differently is played out *in the actions of teaching* and is not necessarily thought out. Thus teachers are not always aware of a reframed view of practice.

The four teachers shown here provide examples of teachers at different levels of frame awareness. While working in the classroom with a perspective of "covering the curriculum," Wendy speaks about a perspective of "learning how to learn," a frame she does not apply to her actions. Nancy is aware that she faces a dilemma of working within two conflicting perspectives on teaching. Through her actions, she comes to a new understanding of her perspective on child-centered learning. Diane and Roger are both aware of their perspectives on teaching and can discuss how they have developed these in relation to their accumulating experience. Roger can explain in detail how his attention to students' learning contributes to his reframed view of inquiry-based learning, and to a set of teaching strategies that incorporate that view.

These teachers also display a developmental pattern of learning from experience. Wendy has yet to explore her educational ideals at the level of practice, because she is still refining strategies. Her colleagues are an important source of knowledge about teaching. Nancy quickly moves from reliance on others for her professional knowledge to a level where she is actively experimenting with her practice and, in doing so, rethinking her ideals. She is beginning to understand how what she does in the classroom can be a source of knowledge about teaching. Diane has experimented with her practice, her theory of learning, and her ideals to achieve greater consistency between practice and philosophy. She now realizes that there is a further level of professional learning--that of constructing her own knowledge. For reasons we are only beginning to understand, Roger works quickly and comfortably within the framework of constructing his knowledge about teaching, constantly interrelating classroom events and ideas about learning, aware of their interaction as he develops new strategies for engaging his students with science.

Our work with these and other teachers, using the perspectives of metaphor and reflection-in-action, has shown us that *there is a significant developmental process of learning to teach, in which experience plays an important but poorly understood role.* Our study of the development of teachers' professional knowledge illustrates how Schön's (1983) concept of *reflection-in-action* can bring to light important features of the ways teachers learn from experience. Regardless of the quantity or quality of reflection-in-action by various participants, the teachers who have found our research valuable over an extended period seem to share the following attitudes:

1. They welcome our presence and attention to their teaching, in observations and in interviews, once they have experienced several visits and understand the experience of our research procedures.
2. They quickly attend to the verbatim transcriptions we return to them after each interview; they think about the transcripts and build on them, in thought and in action.
3. They tolerate, even welcome, our questions about possible inconsistencies within the interviews and possible gaps between what they tell us they do and what we see them do as they teach.
4. They value opportunities to think and talk about what is happening in their classrooms, and they generate new teaching actions as they participate in the study.

References

Barnes, D. (1976). *From communication to curriculum.* Harmondsworth, England: Penguin Books.

Driver, R. (1983). *The pupil as scientist?* Milton Keynes, England: Open University Press.

Munby, H. (1986). Metaphor in the thinking of teachers: An exploratory study. *Journal of Curriculum Studies, 18,* 197-209.

Russell, T. L. (1986, April). *Beginning teachers' development of knowledge-in-action.* Paper presented at the meeting of the American Educational Research Association, San Francisco. (ERIC Document Reproduction Service No. ED 270 414)

Russell, T. L. (in press). From pre-service teacher education to first year of teaching: A study of theory and practice. In J. Calderhead (Ed.), *Teachers' professional learning.* London: Falmer Press.

Schön, D. (1983). *The reflective practitioner: How professionals think in action.* New York: Basic Books.

Schön, D. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions.* San Francisco: Jossey-Bass.